Fact Sheet:

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(LL 8)

METHOD FOR EVALUATING ARMY TRAINING LAND CAPABILITIES

The Problem

As the frequency and intensity of armored military training activities have increased in recent years, so has the potential for environmental damage. The soil surface has been disturbed, vegetation has been destroyed, and soil erosion has accelerated. If allowed to continue unchecked, extensive damage from gullying, sedimentation, and flooding may occur, thus limiting the availability of the land for future training activities and jeopardizing the Army's credibility as a good land manager.

The Technology

The U.S. Army Construction Engineering Research Laboratories (CERL) has developed a method for classifying military lands according to their ability to support military training activities. The classification system incorporates the Universal Soil Loss Equation (USLE) and its Revised Version (RUSLE) , the most widely accepted, user-friendly erosion prediction model currently available. The USLE (A = R x K x LS x C x P) estimates current average annual soil erosion (A) as the product of factors representing climate (R), soil erodibility (K), topography (LS), cover (C) and conservation support practices (P). The erosion estimate (A) is compared to an erosion tolerance (T) value to express the current Erosion Status (A/T). Another important factor for military land managers is an

Erodibility Index, which represents the natural potential of the land to erode without human disturbance.

CERL has integrated the USLE/RUSLE with a computer-based geographic information system (GIS) capability. Data layers are created for each of the component factors of the USLE. This is based on published soil information, satellite imagery, and ground-truthing from the Land Condition-Trend Analysis (LCTA) data collection. Appropriate mathematical operations are performed on the data layers to produce color-coded maps representing the Erosion Status and/or the Erodibility Index for each 20 meter by 20 meter area of soil surface at any given military installation.

The utility of the USLE/RUSLE has been significantly enhanced by altering the manner in which the LS factor is computed. An LS factor analog has been developed that incorporates the unit stream power theory. By taking into account the upslope contributing area, the LS analog extends the applicability of the USLE/RUSLE to complex landscapes with convergent and divergent slopes. By integrating this approach with GIS, it is possible to estimate the location and extent of sediment deposition, thus overcoming major shortcomings of the traditional USLE/RUSLE model.

Benefits/Savings

This land classification system is expected to help: 1) conduct inventories of the current condition and trends of U.S. military training lands, 2) improve scheduling of training activities to avoid severely degraded or highly sensitive areas, 3) demarcate training areas in an effort to consolidate areas of similar condition or capability, thus improving management potential, 4) prioritize land rehabilitation efforts, and 5) evaluate proposed new land acquisition sites relative to suitability for sustained military training.

Status

The classification system, using the traditional LS factor, has been implemented in conjunction with the Army's LCTA program at numerous Army installations in the United States and Germany. Additional information is available in CERL

Technical Manuscript N-91/05, An Erosion-Based Land Classification System for Military Installations, February 1991, and CERL Technical Manuscript EN-93/02, Spot Imagery and GIS in Support of Military Land Management, February 1993. The enhanced version incorporating the LS analog, is nearing completion. It will become an integral enhancement to the Army Training and Testing Areas Carrying Capacity (ATTACC) model.

Point of Contact

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